PRIMARY PROCESSES	SECONDARY PROCESSES
Anaerobic enzymes (zymase, etc.)	Oxygen of the air
↓	↓
Catalase, reductase	Respiratory oxidases
↓	↓
Products of fermentation (alcohol and other substances)	Phytohematins
	↓
	Products of respiration (CO_2, H_2O)

To unify the respiration of animals and plants still further, it will be necessary to show that the oxygen from the air is not combined directly with the hemochromogen, but by the aid of oxidases; and this the recent discovery of these enzymes in the blood renders probable. The behavior of the colorless blood of the lower animals and the sap of plants is quite similar, according to this view.

It is not to be supposed, however, that oxygen does not have other relations than to the chromogens; but these are neglected in the above scheme, which may be taken as only a partial representation of respiratory processes. In fact the more the matter is studied, the more complex and diversified appear the chemical changes subsumed by the word respiration.—C. R. B.

Fungi and hemicelluloses.—In the hope of obtaining some insight into the action of fungi on their hosts, SCHELLENBERG[5] has investigated the behavior of a number of species, which can be cultivated on media of known composition, in respect to their decomposition of hemicelluloses. Those used were several, the products of whose hydrolysis was known. *Molinia coerulea* among the grasses, *Lupinus hirsutus* among the Leguminosae, *Phoenix dactylifera* among palms, *Impatiens Balsamina* and *Cyclamen europaeum* with an amyloid reserve, and *Ruscus aculeatus* among the lilies furnished the hemicelluloses. On hydrolysis they yield respectively dextrose and xylose, galactose and arabinose, galactose and mannose, galactose and xylose, mannose and a little arabinose. A large number of fungi were tested. To explain their action, which he finds strictly specialized and very different from that on true celluloses, SCHELLENBERG has to assume the existence of at least four different enzymes, which he calls the Molinia, the Lupinus, the date, and the amyloid enzymes. Study of their behavior on dead and living plant parts permits similar conclusions. Thus fungi may be used to eliminate hemicelluloses from celluloses in unlignified tissues. The effect of fungi in the destruction of the plant constituents in the soil is probably much more important than has been believed hitherto.—C. R. B.

Jurassic plants.—SEWARD[6] has published the results of his study of collections of Jurassic plants from Caucasia and Turkestan, sent by the Comité Géologique de Russie. The Caucasian collection contains representatives of the

[5] SCHELLENBERG, H. C., Untersuchungen über das Verhalten einiger Pilze gegen Hemizellulosen. Flora **98**:257–308. 1908.

[6] SEWARD, A. C., Jurassic plants from Caucasia and Turkestan. Mém. Comité Géol. Russie N. S. **38**:1–48. *pls. 1–8*. 1907.

following groups; Equisetales (an Equisetites), Filicales (a species each in Marattiaceae, Osmundaceae?, Schizaeaceae, and Cyatheaceae?), Bennettitales (a Williamsonia), Ginkgoales (a Baiera), and Coniferales (a Pagiophyllum); in addition to these, there are four unassigned cycadophytes and two species of Podozamites. The collection from Turkestan includes approximately the same range of forms, adding a species of Dipteridinae and eight species of unassigned Filicales, but showing no Marattiaceae or Schizaeaceae; representing Gink, goales by two species of Ginkgo; and adding three Coniferales. In conclusion, the relations of these floras to those of other regions are shown by a table; and also the wide distribution of some of the species. Among the striking facts are the existence of so many species for a considerable time during the Mesozoic; the general uniformity in the composition of both the Rhaetic and Jurassic floras in different parts of the world; and the remarkable paucity of cycadean remains in the Turkestan beds.—J. M. C.

Light perception.—ALBRECHT has examined a large number of the endemic plants of northern Germany for the organs of light perception (lenticular epidermis, ocelli, etc.) to which HABERLANDT attributes the capacity of distinguishing differences of light intensity. He finds[7] the organs very rare, and when they are present, nearly as common on the under as on the upper surface of the leaf, though it is clear that to the illumination of the upper surface alone is due the exact placing of the leaf in the fixed light position. No difference appeared in the adaptation of sun and shade leaves to the perception of light. He adduces again the experiments made by coating leaves with water, gelatin, and oil, as evidence against HABERLANDT'S theory. After the reading of the paper, HABERLANDT spoke of the faulty methods in all the latter experiments, describing a mode of coating a part of the leaf with water and leaving the other part dry. On stimulating the two parts with light from different directions, the dry part was always the controlling one, even though the light was much weaker. HABERLANDT considers these experiments (to be detailed later) quite decisive. It may be pointed out, however, that other factors than light are here operative and that the weight of evidence is clearly against HABERLANDT.—C. R. B.

Invertase of the date.—VINSON has studied further[8] the invertase of greenr and ripe dates, in an endeavor to discover the reason for its inextractability from the green fruit. He finds that the tannin present does not make it insoluble, nor can it be extracted from ground pulp, so that impermeability of the cell membranes is excluded. He proposes the theory "that green date invertase and possibly other endoenzymes are held in an insoluble combination by some constituent of the protoplasm. In some cases this combination may be broken

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7 ALBRECHT, G., Ueber die Perception der Lichtrichtung in den Laubblättern. Ber. Deutsch. Bot. Gesells. **26a**:182–191. 1908.

8 VINSON, A. E., The endo- and ektoinvertase of the date. Jour. Am. Chem. Soc. **30**:1005–1020. 1908. Cf. earlier paper, BOT. GAZETTE **43**:393. 1907.